

IZT R3600

Product Brochure

Version 1.1



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1 Overview

The IZT R3600 offers up to five channels with 24 MHz instantaneous bandwidth each and covers the frequency range from 9 kHz to 3 GHz or even 6 GHz. The innovative multi-channel receiver system enables users to combine direction finding and monitoring by using free channels as individual monitoring channels.

The IZT R3600 is ideal for both fixed and mobile applications and can easily be synchronized with an external GPS reference. The scalable multi-channel receiver system reduces the number of external devices and minimizes overall system costs. The modular concept makes the device extremely easy to maintain. The compact design in one 19-inch, 8U chassis facilitates easy transport and set-up. With the IZT R3600, IZT meets the requirements of a multitude of applications such as ITU-R spectrum monitoring measurements, real-time signal analysis, spectrum allocation analysis, automatic signal detection, search, intercept and direction finding, strategic and tactical reconnaissance.

The IZT R3600 provides integrated frequency and clock conditioning. An internal calibration unit reduces downtime to a minimum. Providing a high stability reference, the IZT R3600 performs high-precision direction finding and can take bearings of all signals in a wide frequency range of up to 6 GHz. It allows to analyze and demodulate modern digital wideband signals as well as to track or intercept frequency agile systems over a wide range of bandwidths.

The single modules are based on the IZT R3000. Please check the latest revision of the IZT R3000 series product description for additional information on functionality.

- Scalable multi-channel receiver system
- Up to 5 channels with 24 MHz instantaneous bandwidth each
- Suitable for direction finding (DF)
- Combined DF and monitoring possible
- Frequency range 9 kHz - 3 GHz / 6 GHz for DF, up to 18 GHz for monitoring
- Internal calibration, synchronization and high stability reference
- Can be synchronized to an external GPS reference
- For fixed and mobile systems

2 System Components

2.1 Receiver Channels

The IZT R3600 can be configured with up to five individual receive channels.

These channels can be synchronized for phase coherent 5-channel DF applications, they can be fully independent channels for monitoring systems or a mixture of both providing for example a 3-channel DF system with two additional independent monitoring receivers.

It is also possible to leave receiver slots unpopulated.

2.2 Noise Source

The IZT R3600 contains a noise source which can be applied to all VUHF inputs instead of the antenna signals. This can be used by external software processing to calibrate the individual channels with respect to each other. The power level of the noise source is adjustable to match the receiver's wide dynamic range

2.3 Local Oscillator Distribution

The IZT R3600 features an internal clock and local oscillator distribution system to provide phase coherent channels for optimum direction finding performance.

An internal generated synchronization pulse assures synchronized data retrieval from all five receiver channels.

2.4 10 MHz Reference

The IZT R3600 contains a high stable oven controlled crystal oscillator (OCXO). After a warm-up phase of approximately 5 minutes the OCXO has reached its steady state.

The internal OCXO can be locked to an external 10 MHz reference by connecting the reference to the 10MHZ_IN input.

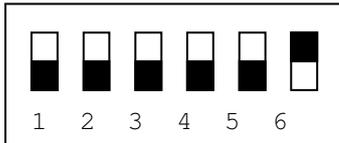
The IZT R3600 automatically detects the presence of an external signal and will synchronize to this reference.

Please note that the possibility to lock the internal OCXO to an external 10 MHz is not available by default.

2.5 Synchronization Pulse

The IZT R3600 generates synchronization pulses internally. Interval lengths from 125 milliseconds up to 8 seconds can be chosen.

Alternatively it is possible to feed an external synchronization pulse. Any rising edge on the SYNC_IN connector will be used as a basis for the internal sync mechanism. To enable the R3600/9 for external synchronization it is necessary to configure the jumper settings on the backplane of the chassis.



Default setting for internal 1 sec synchronization pulse: switch 1-5 down, switch 6 up

The DIP positions 1 – 3 define the duration of the internal synchronization pulse:

DIP 1	DIP 2	DIP 3	Pulse duration
down	down	down	1 second / 1 Hertz
up	up	up	125 milliseconds / 8 Hertz
up	up	down	250 milliseconds / 4 Hertz
up	down	up	500 milliseconds / 2 Hertz
up	down	down	1 second / 1 Hertz
down	up	up	2 seconds / 0,5 Hertz
down	up	down	4 seconds / 0,25 Hertz
down	down	up	8 seconds / 0,125 Hertz

The DIP positions 4 and 5 are reserved and must remain in position "down" for normal operation.

The DIP position 6 defined the source for the synchronization output signals SYNC OUT 1-8:

- DIP position 6 = up : internal pulse generation as source

DIP position 6 = down : external pulse as source

3 Specifications

3.1 Front Panel

LAN1 ... LAN5: LAN interface for up to 5 channels



3.2 Rear Panel

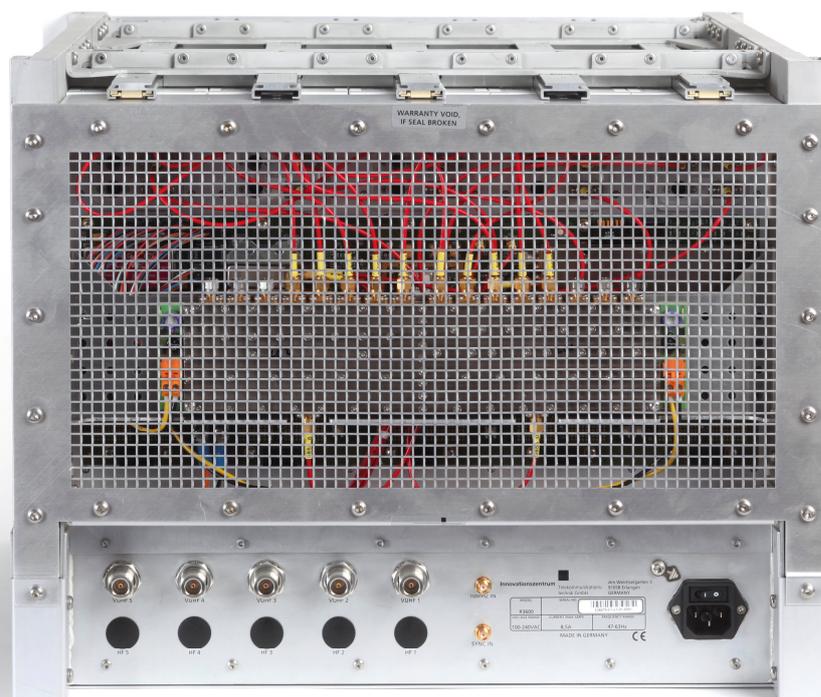
VUHF 1 ... VUHF 5: RF input for up to 5 channels, frequency range 30 MHz ... 6 GHz

HF 1 ... HF 5: RF input for up to 5 channels, frequency range 9 kHz ... 30 MHz

SYNC IN: Synchronization pulse input

10MHZ IN: 10 MHz reference input

Power: Wide range power supply input 110/220 VAC, 50/60 Hz



3.3 Technical Specifications

The following specifications are for one single channel

Frequency range 9kHz – 3GHz

Frequency range		9 kHz to 3 GHz
Conversion concept	9 kHz to 30 MHz	direct sampling
	30 (20) MHz to 3 GHz	double conversion superheterodyne
Maximum input power		+15 dBm
Tuning resolution		1 Hz
Tuning accuracy		< 0.2 Hz
VSWR		< 2.1
Internal reference stability		< 1×10^{-7}
Oscillator phase noise	9 kHz to 30 MHz	-130 dBc/Hz typical @ 1 kHz offset -140 dBc/Hz typical @ 10 kHz offset
	30 MHz to 3 GHz	- 120 dBc/Hz typical @ 10 kHz offset
Sweep time		< 3 ms
Scanning speed	frequency scan, linear	> 4 GHz /sec
3 rd -order intercept point	9kHz – 30 MHz (normal mode)	+40 dBm, typical
	30 MHz to 3 GHz (low distortion mode)	+24 dBm, typical
	30 MHz to 3 GHz (normal mode)	+13 dBm, typical
Noise figure	9kHz – 30 MHz (normal mode)	9 dB, typical
	20 MHz to 3 GHz (low noise mode)	10 to 12 dB, typical
	20 MHz to 3 GHz (normal mode)	14 to 15 dB,
IF rejection		> 120 dB, typical
Image rejection		> 110 dB, typical
Oscillator reradiation at antenna output		< -110 dBm, typical
Preselector filter	9kHz – 30 MHz	12-Band suboctave filter
	30 MHz to 3 GHz	11-Band suboctave filter

Frequency range 3 GHz to 6 GHz

Frequency range		3 GHz to 6 GHz
Impedance		50 Ohm
Maximum input power		+15 dBm
Tuning resolution		1 Hz
Tuning accuracy		< 0.2 Hz
VSWR		< 2.1
Internal reference stability		< 1×10^{-7}
Oscillator phase noise		-114 dBc/Hz typical @ 10 kHz offset
Sweep time		< 3 ms
Scanning speed	Frequency scan, linear	> 4 GHz /sec
3 rd -order intercept point	Normal mode	+18 dBm, typical

Noise figure	Low noise mode	7 dB, typical
IF rejection		> 120 dB, typical
Image rejection		> 110 dB, typical
Oscillator reradiation at antenna output		< -110 dBm, typical
Preselector Filter		8-Band

The following specifications are for the complete IZT R3600 unit

External 10 MHz Reference

Frequency	10 MHz \pm 10 Hz maximum
Power Level	0 ... +10 dBm

External Synchronization Pulse

Low Level	0.5 Volt, maximum
High Level	2.0 Volt, minimum – 3.3 Volt, typical
Rise or Fall Time	1ns / Volt
Operating Temperature	0°C to +50°C
Storage Temperature	-20°C to +70°C
Humidity	max. 85%, non-condensing

Mechanical

Width	19 Inch
Height	8 U
Depth	500 mm / 527mm with handles
Weight	Approx 45 kg

External Interfaces

HF1 to HF 5.....	50 Ohm, N-female
VHF1 to VHF5	50 Ohm,, N-female
SYNC IN	CMOS 3.3 Volt (5 Volt tolerant input), SMA-female
10MHZ IN	50 Ohm, 10 MHz, 0 dBm ... +10 dBm, SMA-female
Power Supply	IEC320, 100 - 250 VAC, 50-60 Hz

Specification subject to change without prior notice.

4 Ordering Guide

DIRECTION FINDER

IZT R3600-DF5 five-channel DF 20 MHz-3000MHz	five-channel DF receiver system 20MHz - 3000MHz <ul style="list-style-type: none"> • 1x IZT R3601 Master RX with LO • 4x IZT R3602 Slave RX without LO <ul style="list-style-type: none"> • integrated clock and LO distribution • internal 10 MHz reference frequency and 1PPS generation and distribution, switchable to external references • noise generator for calibration of the frequency range 20-3000 MHz
IZT R3600-HF	extension five-channel DF frequency range 9 kHz - 30 MHz
IZT R3600-RF6	extension five-channel DF frequency range 3000 MHz - 6000 MHz

MONITORING

IZT R3600-M5 five-channel monitoring	five-channel Monitoring System 9kHz - 3000MHz (5x IZT R3603 Monitoring Rx) <ul style="list-style-type: none"> • internal 10 MHz reference frequency and 1PPS generation and distribution, switchable to external references
IZT R3600-M4 four-channel monitoring	four-channel Monitoring System 9kHz - 3000MHz (4x IZT R3603 Monitoring Rx) <ul style="list-style-type: none"> • internal 10 MHz reference frequency and 1PPS generation and distribution, switchable to external references
IZT R3603	Option: additional R3603 monitoring channel. Frequency range 9 kHz – 3000 MHz
IZT R3603-RF6	Option: frequency range extension RF6 per one IZT R3603 monitoring channel, frequency range 3 GHz – 6 GHz
IZT R3603-RF18	Option: frequency range extension RF18 per one IZT R3603 monitoring channel, frequency range 3 GHz – 18 GHz